

Butterfly range extensions in the Philippines and Indonesia

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Abstract

Recent curation of the butterfly collections in the National Museum of Natural History in Manila, Philippines, and the McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, USA, resulted in new island records of *Ideopsis juvena luzonica* (Nymphalidae: Danainae) from Mabog Island in the Babuyan Islands, Philippines, *Cheritra freja pallida* (Lycaenidae: Theclinae) from Sebuku Island, Borneo, and *Eurema hiurai* (Pieridae: Coliadinae) in Zambales (Luzon) and Cotabato (Mindanao), Philippines.

Keywords: butterflies, range, Philippines, Indonesia

The Philippines is a megadiverse biodiversity hotspot (Mittermeier et al. 1997; Myers et al. 2000). The archipelago has more than 7,100 islands and a complex geologic history that has contributed to generating its incredible species richness (Brown et al. 2013). Even small islands can have high species diversity (Jonsson and Holt 2015; Li et al. 2017). Unlike most other tropical countries, the geographic distributions of the Philippines' 900+ butterfly species are well documented, thanks to decades of work by Colin 'Trig' Treadaway and his collaborators (Treadaway and Schroeder 2012). Nonetheless, while curating the butterfly collections of the National Museum of Natural History (Manila, Philippines) and the McGuire Center for Lepidoptera and Biodiversity (Gainesville, Florida, USA), we found several specimens that expand the known ranges of their species.

Ideopsis juvena luzonica was described as *Radena luzonica* by Moore in 1883 from type material collected in northern Luzon. The island from which the type specimen was

collected is not known, but D'Abrera (1982) and Yata and Morishita (1985) inferred that it was one of the islands in the Babuyan Islands. The distribution of *I. juvena luzonica* recorded by Treadaway and Schroeder (2012) is listed as the Babuyan and the Batanes Islands, which are small island groups. It is possible that the first or all of the specimens of *I. juvena luzonica* were collected on a single island: Babuyan Island.

New island records

Ideopsis juvena luzonica (Moore 1883)

Previously recorded subspecies distribution: Babuyan and Batanes Islands (Treadaway and Schroeder 2012)

Range extension: Mabog Island (Babuyan Islands). V. Samarita, leg. 3/11/1990 (Figure 1g–h)

Specimen repository: National Museum of Natural History, Philippines

Cheritra freja pallida (H. Druce 1873)

Previously recorded subspecies distribution: Borneo, Pulau Laut, Karimata (Seki et al. 1991)

Range extension: Sebuku island (an island east of Pulau Laut). According to Yusuke Takanami (pers. comm.), the newly recorded specimens are either a dry season form or collected from an arid habitat (Figure 2a–b).

Specimen repository: McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Florida, USA

Eurema hiurai Shirozu & Yata 1977 is endemic to the Philippines and has three described subspecies: *E. h. admiranda*

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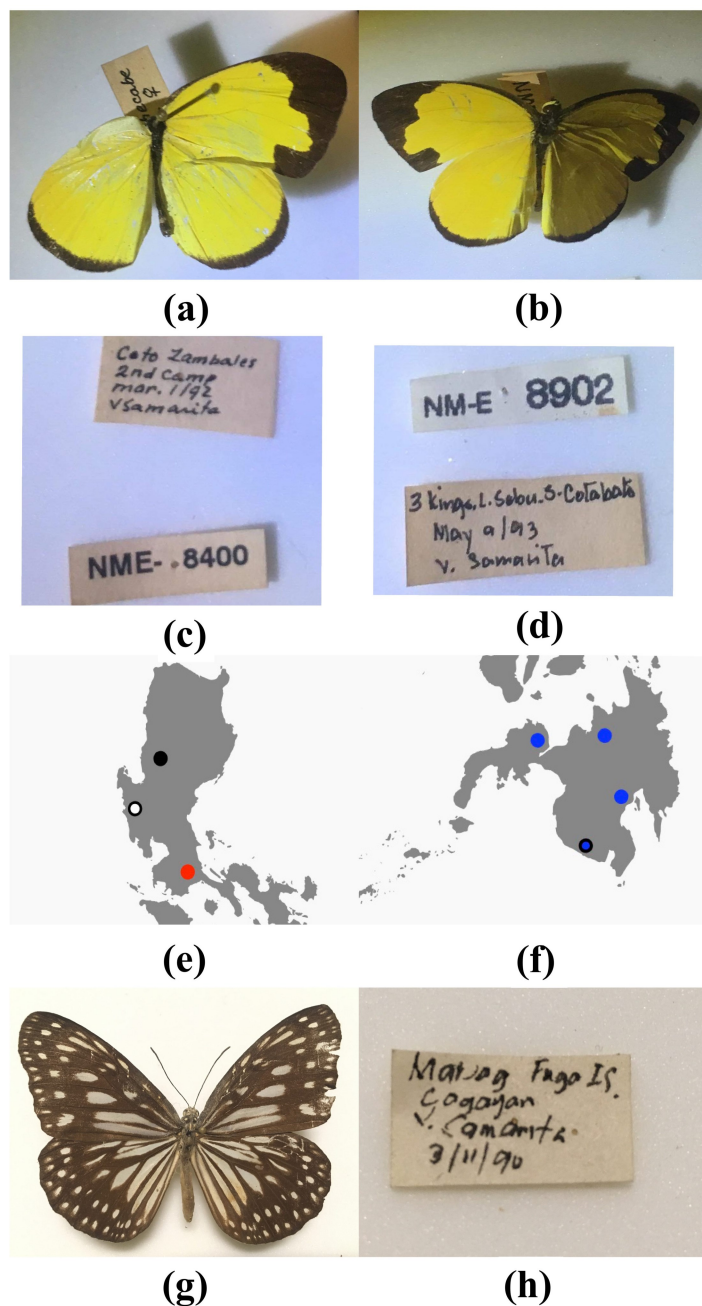


Figure 1. (a) *Eurema hiurai admiranda* ♂; Zambales, Luzon, (b) *Eurema hiurai hiurai* ♂; Cotabato, Mindanao. (c) Museum labels of *E. hiurai admiranda*, (d) Museum labels of *E. hiurai hiurai*, (e) Some collection localities of *Eurema hiurai admiranda* in Luzon. The black circle indicates the locality where *E. h. admiranda* was first collected, while the white circle with black outline indicates the range extension. The red circle indicates the first collection locality of *E. h. banahawensis*, (f) Some collection localities of *E. h. hiurai* in Mindanao. Blue circles are based on previous publications, while the blue circle with the black outline indicates the range extension, (g) *Ideopsis juvena luzonica* ♀, (h) Museum label of *I. j. luzonica*

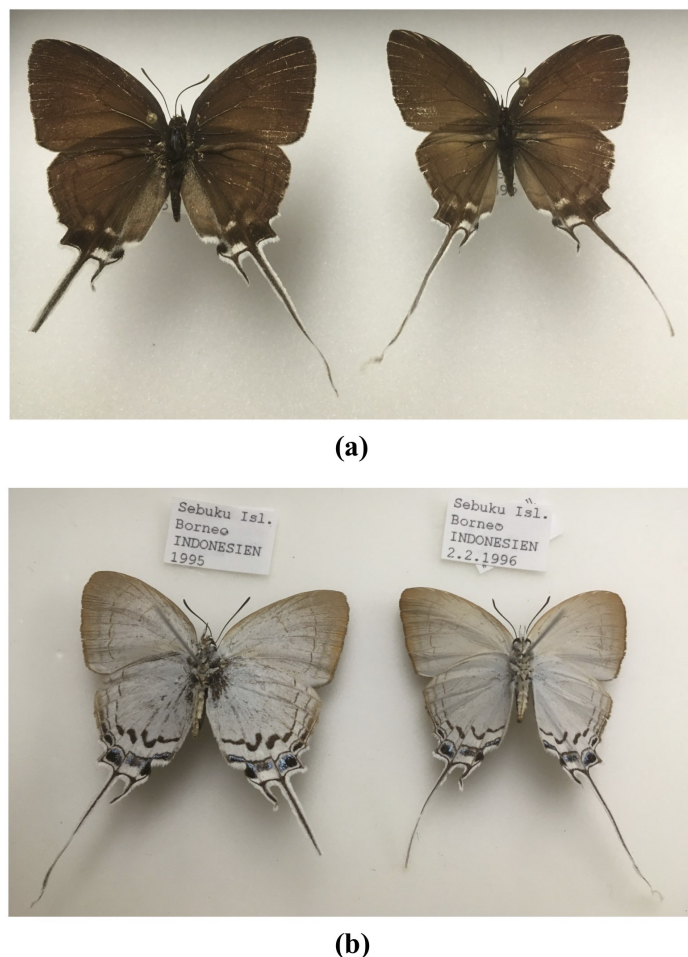


Figure 2. (a) *Cheritra freja pallida*; upperside, and b) *C. f. pallida* underside including museum labels.

Morishita 1981 in northern Luzon, *E. h. banahawensis* Yata & Kitamura 1998 in southern Luzon, and the nominotypical subspecies in Mindanao. The life history of this species is still unknown (Yata 1992). The holotype of *Eurema hiurai* was collected on November of 1969 in Palan-Capatagan, Davao del Sur (Mindanao), and the species was described along with specimens collected from Mt. Malindang on the Zamboanga Peninsula, Calinan in Davao del Sur, and Malitbog in Bukidnon.

Venancio Samarita collected a single specimen of *E. hiurai* (Figure 1a–b) on May 1993 from Lake Sebu in South Cotabato (Mindanao) (Figure 1d), and another specimen on March 1992 in Zambales (Luzon) (Figure 1c). These are the southernmost record of *Eurema hiurai hiurai* in Mindanao and the westernmost record of *Eurema hiurai admiranda* in Luzon. The specimens are deposited in the National Museum of Natural History in Manila, Philippines. It is possible that this species may occur in other mountain ranges of Luzon and Mindanao. Whether future discoveries will be a new subspecies or not require further exploration and research.

According to Yata (1992), *Eurema hiurai* is closely related to *Eurema lacteola* (Distant), and the latter species is currently distributed in Sibutu (Treadaway and Schroeder 2012)—one of the southwestern islands of the Sulu Archipelago. *Eurema hiurai* is currently known only from Luzon and Mindanao, and the Negros Ark Hypothesis (Badon 2018) may explain the disjunct distribution of *E. hiurai* on these two widely separated islands. This butterfly is rare and inhabits montane forests around 1000 m above sea level (Yata 1992).

Range extensions

Eurema hiurai hiurai Shirozu & Yata 1977

Distribution: Mindanao

Previously recorded distribution in Mindanao: Mt. Malindang, Zamboanga Peninsula, Davao del Sur, and Bukidnon

Range extension in Mindanao: Lake Sebu, southwest Cotabato (Figure 1f)

Eurema hiurai admiranda Morishita 1981

Previously recorded subspecies distribution: Northern Luzon

Previously recorded distribution in northern Luzon: Baguio

Range extension in Luzon: Zambales (Figure 1e)

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